

Patent Application of
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for

Title: BURIED WATER RESERVOIRING NETWORK FOR PLANT CULTIVATION

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| CROSS-REFERENCE TO RELATED APPLICATIONS | Not Applicable |
| FEDERALLY SPONSORED RESEARCH | Not Applicable |
| SEQUENCE LISTING OR PROGRAM | Not Applicable |

BACKGROUND OF THE INVENTION—FIELD OF INVENTION

This invention is related to irrigation and chemical applications to agricultural, turf, garden, forestry and other cultivars and more particularly to associated below soil surface systems, materials and/or methods for capturing and retaining water and/or other fluids, nutrients and chemical mediums beneficial to crop optimization.

BACKGROUND OF THE INVENTION

The demands of increasing food supplies for the worlds expanding population are constrained by available water, exhaustion of fertile cropland and consequences of environmental degradation.

There are lands that are agriculturally unproductive or marginally so due to insufficient water supplies and/or inability of the soil to retain water for adequate plant growth. There are lands that are agriculturally productive with the burden of excessively high irrigation and chemical application costs that could benefit from reductions of such costs. There are populations that resource water contaminated by agricultural chemical applications that could benefit from the containment of such.

In addition, inasmuch as some water received by rainfall or applied by various irrigation methods may percolate beyond the root zone of the plants, it is lost prior to plant transpiration and other plant health benefits. Herbicides, pesticides, fertilizers and nutrients applied may also percolate beyond the root zone of the plants, contributing to material and other losses.

Additionally, repetitive and excessive percolation through the soil may dissolve salts within the soil and may carry such (and/or other solutions such as those containing herbicides, pesticides, fertilizers

and nutrients) into underground aquifers and water tables. Water and the attendant pollutants so acquired, may be recycled by pumping from wells and returned into plant irrigation, thereby continuously contributing to an overloading of these salts, minerals and/or other chemicals, resulting in contamination of the topsoil and a loss of agriculturally productive land. Furthermore, such aquifers, water tables and/or downstream water sources contributed to by field leached runoff could then be contaminated, leading to failure of drinking water supplies and damage to environmental ecosystems.

DESCRIPTION OF THE PRIOR ART

The prior art includes a variety of materials and/or combinations thereof that are placed beneath the root zone of a plant or plants, for the purposes of water control and/or plant/s containment. They are found within the following categories:

- A. Fluid applied materials such as asphalt or oil, as shown in U.S. Pat. No. 4,047,387. Materials of such are known to have toxic consequences to atmosphere, water, soil and life forms. Applications of such does not allow for percolation of excessive water to beneath the membrane nor for evaporative permeation of moisture contained beneath the membrane. Individual reservoirs to provide uniformity of water distribution are not provided.
- B. Rigid or flexible material of solid single or multiple sheets, as shown in U.S. Pat. No. 3,309,875; 4,636,112; and 5,460,867. Applications of such materials do not allow for percolation of excessive water to beneath the membrane nor for evaporative permeation of moisture contained beneath the membrane. Individual reservoirs of division small enough to provide uniformity of water containment and distribution are not provided.
- C. Swell-able colloidal clay/s such as bentonite, as shown in U.S. Pat. No. 4,154,549 and 5,237,943. Applications of such materials do not allow for percolation of excessive water to beneath the membrane nor for evaporative permeation of moisture contained beneath the membrane. Individual reservoirs to provide uniformity of water distribution are not provided.
- D. Multiple container cells as shown in U.S. Pat. No. 5,589,240 are provided as initial propagation devices and do not allow for percolation of excessive water to beneath the membrane nor for evaporative permeation of moisture contained beneath the membrane.
- E. Separate containers, as shown in U.S. Pat. No. 668,362; 774,988; 1,439,973 and 5,383,744. Installations of such do not provide a continuous membrane thereby allowing high losses of irrigation and chemical/s applied.

BACKGROUND OF INVENTION-OBJECTS AND ADVANTAGES

An advantageous object of the present invention is to provide a fluid retentive device that reservoirs water beneath the root zone of crops and/or other cultivars for a time period greater than the normal water retention capacity of the soil. Wherein, consistency and uniformity of water availability to the root zone is improved, so that irrigation frequencies and quantities may be reduced, and the cultivars growth rate and health potentials are maintained and/or enhanced.

An advantageous object of the present invention is to provide a fluid retentive device that reservoirs fluids containing fertilizers, pesticides and herbicides beneath the root zone of crops and/or other cultivars. Wherein, consistency of such chemical/s availability to the root zone is improved, so that the frequencies and quantities of application requirements may be reduced, and the cultivars growth rate and health potentials are maintained and/or enhanced.

An advantageous object of the present invention is to provide fluids and/or vapors from beneath the network an evaporative transmission means through holes or openings within the network into the plant root zone and the upper levels of soil. Wherein, evaporation speeds of such fluids are reduced, thereby providing crops and/or other cultivars transpiration use of such fluids prior to their evaporative loss into the atmosphere.

An advantageous object of the present invention is to provide improved control over groundwater and downstream contamination due to subsoil leaching runoff of fertilizers, pesticides and herbicides applications. Seepage of such through and beyond the network is limited and potentially arrested; the fluid retaining qualities of the network restricts downward and subsurface lateral flows of such.

Another advantageous object of the invention is to provide improved control over salt loading in the soil. Pumping frequencies and quantities of below ground water or other transmissions of water containing salts in solution are reduced due to the water retaining qualities of the network, thereby protecting the crops and/or other cultivar's health, and expanding the longevity of the soils fertility cultivation potential.

These and other advantages are accomplished by the fluid retaining device, which contains a plurality of open concave reservoir basins with a plurality of holes or openings at or near their crests; the network is engineered sufficiently rigid to maintain adequate fluid holding capacity following imposed soil loading and equipment compaction.

In accordance with the invention, the fluid retaining device is manufactured in the field of application/installation or off site with common materials and techniques.

While the foregoing is the preferred embodiment of my invention, further objects and advantages will become apparent from a consideration of the following drawings and ensuing descriptions.

DRAWINGS—FIGURES

FIG 1. is a perspective and sectional view of the network

FIG 2. is a sectional view of the network, shows fluids 7 within the concave reservoir basins 6

FIG 3. is a perspective and sectional view of the network, shows contiguous concave reservoir basins 6 separated by openings 12, without holes 8

DRAWINGS—Reference Numerals

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| 1. Network | 5. Soil surface | 9. Crests |
| 2. Soil | 6. Concave reservoir basins | 10. Subsoil |
| 3. Root zone | 7. Fluids | 11. Basin walls |
| 4. Cultivars | 8. Holes | 12. Openings |

DETAILED DESCRIPTION—FIGS. 1, 2, AND 3--PREFERRED EMBODIMENT

Soil 2 is excavated and temporarily removed such that the network 1 may be installed at a predetermined depth suitable for the mature root zone 3 of the selected crop or other cultivars 4. Soil 2 is replaced to a predetermined soil surface 5 upon the network 1 such that the network 1 is in position horizontally and in a plane substantially parallel beneath the soil surface 5. The network 1 contains a contiguous plurality of concave reservoir basins 6 facing soil surface 5 to collect water and/or other fluids 7 that are in excess of the retentive properties of the soil 2. Water and/or other fluids 7 are arrested within reservoir basins 6 to be stored and to remain available to the root zone 3 of

crops or other cultivars 4. Water and/or other fluids 7 in excess of reservoir basins 6 capacities may percolate downwards-through holes 8 or openings 12 positioned on or near crests 9 of reservoir basins 6 to subsoil 10. Fluids and/or vapors not shown contained within subsoil 10 below network 1 may percolate upwards through holes 8 or openings 12 into soil 2 wherein soil 2 moisture content has become less than moisture content of subsoil 10, to remain available to the root zone 3 of crops or other cultivars 4. Water and/or other fluids 7 contained within reservoir basins 6 are limited in lateral migration by reservoir basin walls 11. The dimensions of the reservoir basins 6 relative to height of crests 9 and distance between basin walls 11 and the diameter of the holes 8 are adjusted in the manufacture of the network 1 to meet the characteristics of the predetermined cultivars 4 and the site specific requirements of irrigation and other agricultural management practices in attempt to optimize benefits to the predetermined crops or other cultivars 4 in relation to natural or engineered site conditions.